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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/045,315	10/24/2001	Chris Baldwin	884.537US1	1252

7590

12/18/2002

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EXAMINER

NADAV, ORI

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	<p>Application No.</p> <p align="center">10/045,315</p>	<p>Applicant(s)</p> <p align="center">BALDWIN, CHRIS</p>	
	<p>Examiner</p> <p align="center">ori nadav</p>	<p>Art Unit</p> <p align="center">2811</p>	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Election/Restriction

1. Applicant's election without traverse of Group I, claims 7-20 in Paper No. 3 is acknowledged.

Oath/Declaration

2. The oath/declaration filed on 10/24/2001 is acceptable.

Drawings

3. The formal drawings filed on 10/24/2001 are acceptable.

Information Disclosure Statement

4. If applicant is aware of any relevant prior art, he/she requested to cite it on form PTO-1449 in accordance with the guidelines set forth in M.P.E.P. 609.

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Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 7 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Saito et al. (5,570,274).

Saito et al. teach in figure 8 and related text (column 8, line 15 to column 9, line 20) an electronic package comprising: an interposer 1 having an upper surface and a lower surface; a die 2 secured to the upper surface of the interposer; a pin carrier 4 having a cavity 25, the pin carrier being secured to the lower surface of the interposer such that the cavity is against the interposer opposite to the die; an electronic component 2 (the bottom chip) secured to the lower surface of the interposer, the electronic component 2 being positioned within the cavity 25 in the pin carrier; and an encapsulant 25 at least partially filling the cavity to mechanically support the interposer during mechanical loading the package.

Although Saito et al. do not name element 1 as interposer, element 1 supports chip 2 and interposes between chip 2 and pin carrier 4, thus meeting the functional recitation of an interposer.

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Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 8-17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. in view of Applicant Admitted Prior Art (AAPA).

Regarding claim 9, Saito et al. teach in figure 8 and related text substantially the entire claimed structure, as applied to claim 7 above, except an electronic component being a capacitor and the interposer is thin enough to minimize the inductive loop between the capacitor and the die.

AAPA teaches in figure 2 and related text an electronic component is a capacitor 28 and the interposer is thin enough to minimize the inductive loop between the capacitor and the die. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form a capacitor in Saito et al.'s device wherein the interposer is thin enough in order to minimize the inductive loop between the capacitor and the die when the device is used in an application which requires capacitors.

Regarding claims 8 and 11-13, AAPA teaches an interposer is a composite metal and organic material, wherein the pin carrier is attached to the interposer using a ball grid

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array of solder balls, wherein the cavity in the pin carrier includes a perimeter and the die includes a perimeter substantially aligned with the perimeter of the cavity (in the horizontal direction), wherein the cavity in the pin carrier includes a perimeter and the die includes a perimeter that is smaller than the perimeter of the cavity (in the vertical direction)

Regarding claims 14, 17 and 19, AAPA teaches an interposer being as thin as possible. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an interposer having a thickness less than 1mm in Saito et al.'s device in order to minimize the inductive loop between the capacitor and the die.

Regarding claim 15, AAPA teaches a data processing system comprising a memory, a processor; and a package including an interposer. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to connect the various elements of the data processing system in Saito et al.'s device via a bus in order to be able to operate the device.

Regarding claims 10 and 20, Saito et al. teach a resin being epoxy (column 6, line 17). It would have been obvious to a person of ordinary skill in the art at the time the

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invention was made to use epoxy resin in Saito et al.'s device in order to be able to provide adequate strength and support to the device.

9. Claims 7-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Saito et al. and Dibene, II et al. (6,452,113).

Regarding claims 7 and 18, AAPA teaches in figure 2 and related text an electronic package comprising: an interposer 24 having an upper surface and a lower surface; a die 22 secured to the upper surface of the interposer; a pin carrier 28 having a cavity, the pin carrier being secured to the lower surface of the interposer such that the cavity is against the interposer opposite to the die; an electronic component 28 secured to the lower surface of the interposer, the electronic component being positioned within the cavity in the pin carrier.

AAPA does not teach an encapsulant at least partially filling the cavity to mechanically support the interposer during mechanical loading the package.

Saito et al. teach in figure 8 and related text an encapsulant 25 at least partially filling the cavity. Dibene, II et al. teach an encapsulant at least partially filling the area between the interposer/substrate and the die (column 7, lines 26-28). Regarding claims 10 and 20, Saito et al. teach a resin being epoxy (column 6, line 17). It would have been obvious to a person of ordinary skill in the art at the time the invention was

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made to at least partially fill the cavity of AAPA's device with an encapsulant in order to mechanically support the interposer. The combination is motivated by the teaching of Dibene, II et al. who point out the advantages of using an underfill.

Regarding claims 8-9, 11-13 and 16, AAPA teaches an interposer is a composite metal and organic material, wherein the electronic component is a capacitor and the interposer is thin enough to minimize the inductive loop between the capacitor and the die, wherein the pin carrier is attached to the interposer using a ball grid array of solder balls, wherein the cavity in the pin carrier includes a perimeter and the die includes a perimeter substantially aligned with the perimeter of the cavity (in the horizontal direction), wherein the cavity in the pin carrier includes a perimeter and the die includes a perimeter that is smaller than the perimeter of the cavity (in the vertical direction)

Regarding claims 14, 17 and 19, AAPA teaches an interposer being as thin as possible. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an interposer having a thickness less than 1mm in AAPA's device in order to minimize the inductive loop between the capacitor and the die.

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Regarding claim 15, AAPA teaches a data processing system comprising a memory, a processor; and a package including an interposer. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to connect the various elements of the data processing system in AAPA's device via a bus in order to be able to operate the device.

Regarding claims 10 and 20, Saito et al. teach a resin being epoxy (column 6, line 17). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use epoxy resin in AAPA's device in order to be able to provide adequate strength and support to the device.

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

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Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(703) 308-8138**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas, can be reached at **(703) 308-2772**.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

A handwritten signature in black ink, appearing to read 'Ori Nadav', is positioned above the printed name and title.

O.N.
December 13, 2002

ORI NADAV
PATENT EXAMINER
TECHNOLOGY CENTER 2800